PARADYNE®

SNE2020G-P and SNE2020G-S

2-Port Network Extenders Installation Instructions

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Contents

Software and Firmware License Agreement 2
Product Documentation Online 3
Introduction 4
Package Contents 4
Connecting to Power 5
Switchpack Configuration 6
Connecting the SHDSL Lines 8
Connecting the Ethernet Line 10
Ferrite Chokes 10
LED Indicators 11
EMI Notices 13
ACTA Customer Information 13
Supplier's Declaration of Conformity 14
Notice to Users of the Canadian Telephone Network 15
CE Marking 15
Japan Notice 15
Important Safety Instructions 15

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Product Documentation Online

Complete documentation for Paradyne products is available at **www.paradyne.com**. Select *Support* → *Technical Manuals*.

To order a paper copy of a Paradyne document, or to speak with a sales representative, please call 1-727-530-2000.

Introduction

The family of EFM Based Network Extenders provide an extremely flexible and easy to use solution for providing Ethernet based services to subscribers throughout the service providers network.

The SNE2020 is fully DSL The Easy Way™ compliant, so that configuration requirements are removed completely, allowing this device to be installed into the customer premises quickly. The SNE2020 is also fully DSL The Easy Way packet based utilizing 100 percent packet-based technology for optimum throughput and reliability.

The SNE2020 is a loop bonding endpoint for EFM-based 12000 and 4000 BLCs that provides up to 4.6 Mbps of symmetrical bandwidth using two copper pairs.

The SNE2020 features two SHDSL ports, each capable of up to 2.3 Mbps symmetrical bandwidth. When used with any loop bonding compatible product, two copper pairs may be used to deliver double the bandwidth at any given distance. In addition, the SNE2020 can be used in a point to point deployment for high speed copper connections between two locations.

Loop bonded SHDSL provides automatic load balancing and fail-over to provide optimum redundancy and data throughput, all delivered with a plug and play ease of use.

Package Contents

⚠ HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

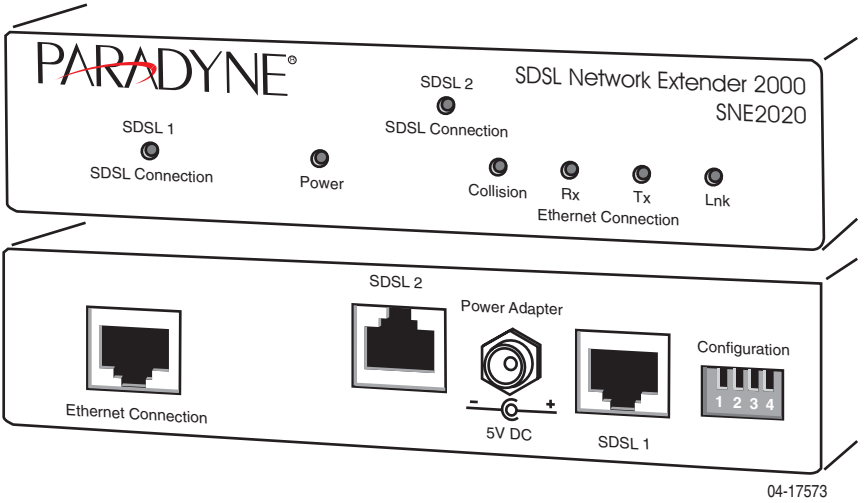
Unpack and Inspect the Equipment. The following components should be included:

- 1 SNE2020G
- 1 Power supply

If there is any visible damage, do not attempt to connect the device. Contact your sales or service provider.

Connecting to Power

Plug the power supply into the Power Adapter port on the back of the SNE2020G and connect it to your power source. Verify that the Power LED on the front of the SNE2020G is illuminated.



Upon start up, the Ethernet link will remain disabled (as indicated by solid illumination of the Ethernet Rx, Tx, and Lnk LEDs) until at least one of the two SHDSL connections has been established.

Switchpack Configuration

Configuration switches for the SHDSL ports are on the back of the SNE2020G, numbered from left to right, 1–4.

Bandwidth: Switches 1–3 (SNE2020G-P Only)

Switches 1–3 on the SNE2020G-P provide eight bandwidth options for the two SHDSL ports. Bandwidth for the two ports cannot be configured individually. Distance capabilities listed in the following table assume the use of 26 American Wire Gauge (AWG) cable. Connections made with cable of a heavier gauge will link up at greater distances. Your SNE2020G may not link up if the cable is in poor condition or if the cable distance is greater than a particular bandwidth will support. If link is acheived under such conditions, traffic quality may be affected.

Table 1. Bandwidth Configuration

Switch Position			**Bandwidth (kbps)**		**Distance**	
1	2	3	Single Line Connection	Double Line Bonded Connection	Feet	Meters
down	down	down	2,320	4,640	11,300	3,444
down	down	up	2,064	4,128	12,200	3,719
down	up	down	1,552	3,104	12,800	3,901
down	up	up	1,040	2,080	16,000	4,877
up	down	down	784	1,568	16,800	5,121
up	down	up	528	1,056	18,400	5,608
up	up	down	400	800	19,400	5,913
up	up	up	Adaptive*	Adaptive*	Varies	Varies

* Adaptive mode allows the SNE2020G-P to train up to the best possible speed supported by the SNE2020G-P, the remote modem to which it is connected, and the copper cable pair(s) connecting the two. The maximum reachable distance for a single line SNE2020G-P connection in Adaptive mode is 25,400 feet (at 144 kbps).

Bandwidth cannot be configured on the SNE2020G-S. Subscriber units determine bandwidth via communication with their partner SHDSL provider unit.

Ethernet Duplex Mode: Switch 4

The Ethernet link can be configured at either Full Duplex or Half Duplex mode. Although both ends of the ETHERNET connection must have the same duplex mode configuration, it is not necessary for partner providers and subscribers to be configured the same. Duplex mode does not apply to the SHDSL link.

- Half Duplex Ethernet – Receive and transmit functions are mutually exclusive. Data transmission occurs in only one direction at a time. Packet collisions are not unusual.
- Full Duplex Ethernet – The Ethernet line can receive and transmit simultaneously, effectively increasing aggregate bandwidth from 10 Mbps to 20 Mbps and preventing packet collisions.

Table 2. Ethernet Duplex Mode Configuration

Switch 4	Duplex Mode
down	Half Duplex
up	Full Duplex

CAUTION:

If you set the SNE Provider or Subscriber unit to Full Duplex, you must also set your connected Ethernet device to 10 Mb Full Duplex. Do not connect a Full Duplex Ethernet port to a Half Duplex port or to an Auto-Negotiate port. Connecting a Half Duplex port (default) to an Auto-Negotiate port will function properly.

Connecting the SHDSL Lines

An SNE2020G-S must be connected via an SHDSL line to an SNE2020G-P, a Mini DSLAM, a Micro DSLAM, or a Broadband Access Concentrator (BAC) interface module. Neither a subscriber-to-subscriber nor a provider-to-provider connection will function.

Loop Bonded Connection

Using two SHDSL lines for one network connection (loop bonding) will yield twice the speed of a single SHDSL connection. A second SHDSL line also provides a backup should one of the lines become disabled.

The SHDSL equipment at both ends of a subscriber line must be loop bonding capable in order for the SNE2020G to utilize the loop bonding feature. Refer to the *SDSL Loop Bonding Product to Product Feature Compatibility* document on the Paradyne website for a complete list of SDSL loop bonding capable products and required firmware versions.

▶ Procedure

To establish a loop bonding connection:

1. Plug your SHDSL cables into the SHDSL RJ45 ports (SDSL 1 and SDSL 2) on the back of the SNE2020G. The order of connection is not important.
2. Verify both connections: the SDSL 1 and SDSL 2 LEDs on the front of the SNE2020G will pulse green to indicate the connections are established and operational.

Single Line Connection

▶ Procedure

To establish a single line connection:

1. Plug your SHDSL cable into one of the two SHDSL RJ45 ports on the back of the SNE2020G. Either port (SDSL 1 or SDSL 2) may be used.
2. Verify the connection: the SDSL LED on the front of the SNE2020G (SDSL 1 or SDSL 2, depending upon which port was connected) will pulse green to indicate the connection is established and operational.

Link up time between local and remote SHDSL network extenders can vary from one to five minutes depending on the quality, gauge and distance of the copper cables. If cable distance is greater than a particular bandwidth will support, the units may not link up or, if they do achieve link, traffic quality may be affected.

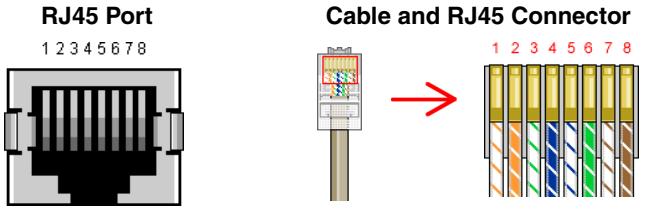


Table 3. SDSL RJ45 Port

Pin	Connection
1	not used
2	not used
3	not used
4	Ring
5	Tip
6	not used
7	not used
8	not used

Connecting the Ethernet Line

Plug the Ethernet cable into the Ethernet Connection RJ45 port on the back of the SNE2020G. Verify the connection: solid illumination of the Ethernet Connection Lnk LED on the front of the SNE2020G indicates a link has been established, if an SHDSL connection has already been made. If an SHDSL connection has not yet been made, the Ethernet link will remain disabled (as indicated by solid illumination of the Ethernet Rx, Tx and Lnk LEDs) until at least one of the two SHDSL links has been established.

Table 4. Ethernet Connection

Pin	Connection
1	Rx+
2	Rx-
3	Tx+
4	not used
5	not used
6	Tx-
7	not used
8	not used

The SNE2020G connects to a PC using a straight-through Ethernet cable and to a hub or a switch using a crossover Ethernet cable. For any other type of connection, the circuit presented by the Ethernet device you are connecting to determines the type of cable you need.

Ferrite Chokes

If ferrite chokes are included with your network extender, install them on all DC power and signal cables. Position the ferrite chokes as close as possible to the body of the SNE2020G.

LED Indicators

Table 5. LEDs (1 of 2)

LED	State	Indication	Additional Information
Power	Solid Green	SNE2020G is operational	If the Power LED is not illuminated, it is unlikely the SNE2020G is receiving power. None of the LEDs will be illuminated.
SDSL 1 & 2	Pulsing Green*	SHDSL connection is established and active	Traffic is flowing.
	Solid Green	Problematic SHDSL connection	A connection exists but there is indication of a problem with the SHDSL line.
	No Illumination	No SHDSL connection	If both SHDSL connections are lost, the Ethernet LEDs will have these states: ■ Collision: Off ■ Rx and Tx: Solid Amber ■ Lnk: Solid Green
Ethernet Collision	No Illumination	Standard	Either there is no traffic or traffic is flowing without any collisions. If there is no Ethernet connection, the Ethernet Collision LED will remain unlit by default. An SNE2020G in Full Duplex mode does not have collisions; the Ethernet Collision LED is only applicable in Half Duplex mode.
	Flashing Red*	Packet collision(s)	The Ethernet packet(s) will automatically be retransmitted.
	Solid Red	Warning	There is a potential traffic problem over the Ethernet segment.

Table 5. LEDs (2 of 2)

LED	State	Indication	Additional Information
Ethernet Rx	Flashing Amber*	Ethernet activity	The SNE2020G is receiving data from the Ethernet network.
	Solid Amber	Heavy Rx traffic	The SNE2020G is receiving large amounts of data from the Ethernet network. A solid amber Ethernet Rx LED can also signify a lost SHDSL connection.
	No Illumination	No activity	Either there is no Ethernet link or a link exists but there is no activity.
Ethernet Tx	Flashing Amber*	Ethernet activity	The SNE2020G is transmitting data across the Ethernet network.
	Solid Amber	Heavy Tx traffic	The SNE2020G is transmitting large amounts of data across the Ethernet network. A solid amber Ethernet Tx LED can also signify a lost SHDSL connection.
	No Illumination	No activity	Either there is no Ethernet link or a link exists but there is no activity.
Ethernet Lnk	Solid Green	Ethernet connection is established	A solid green Ethernet Lnk LED can also signify a lost SHDSL connection.
	No Illumination	No Ethernet connection	The Ethernet Rx and Tx LEDs will remain unlit by default.

* A pulsing LED blinks steadily at a rate of once per second. A flashing LED blinks at a more rapid, less constant rate.

If both SHDSL connections are lost, the Ethernet connection will automatically be disabled (as indicated by solid illumination of the Ethernet Rx, Tx and Lnk LEDs). Upon reestablishment of at least one of the SHDSL links, the Ethernet connection will be reinstated and the Ethernet LEDs will reflect current Ethernet status.

EMI Notices

United States – EMI Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

If the equipment includes a ferrite choke or chokes, they must be installed as described in the installation instructions.

Canada – EMI Notice

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ACTA Customer Information

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of the network extender is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. See installation instructions for details.

If the network extender causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, please contact your local sales representative, service representative, or distributor directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, training, distributor locations, or Paradyne worldwide office locations, use one of the following methods:

- Internet: Visit the Paradyne World Wide Web site at www.paradyne.com. (Be sure to register your warranty at www.paradyne.com/warranty.)
- Telephone: Call our automated system to receive current information by fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-795-8004
  - — Outside the U.S.A., call 1-727-530-2340

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

The customer may make no repairs to the equipment.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

Supplier's Declaration of Conformity

Place of Issue: Paradyne Corporation
8545 126th Avenue North
Largo, FL 33773-1502
USA

Date of Issue: 7/14/2005

Paradyne Corporation, located at the above address, hereby certifies that the Model SNE2020G-P, Model SNE2020G-S, Model SNE2000G-P, and Model SNE2000G-S bearing labeling identification number US:AW2DLNANSNE2020 complies with: the Federal Communications Commission's ("FCC") Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments ("ACTA")-adopted technical criteria TIA-968-A, "Telecommunications - Telephone Terminal Equipment -Technical Requirements for Connection of Terminal Equipment To the Telephone Network, October 2002," as amended by ANSI/TIA-968-A-3 2004, "Telecommunications - Telephone Terminal Equipment -Technical Requirements for Connection of Terminal Equipment to the Telephone Network - Addendum 3."

Patrick Murphy
Senior Vice President, Chief Financial Officer

Notice to Users of the Canadian Telephone Network

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation IC before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

NOTICE: The Ringer Equivalence Number (REN) for this terminal equipment is labeled on the equipment. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.

If your equipment is in need of repair, contact your local sales representative, service representative, or distributor directly.

CE Marking

When the product is marked with the CE mark on the equipment label, a supporting Declaration of Conformity may be downloaded from the Paradyne World Wide Web site at **www.paradyne.com**. Select *Library* → *Technical Manuals* → *CE Declarations of Conformity.*

Japan Notice

Class A ITE

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.

3. Do not attempt to service this product yourself, as opening or removing covers may expose you to hazardous voltage or to other risks. Refer all servicing to qualified service personnel.

4. General purpose cables are used with this product for connection to the network. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer. Use a UL Listed, CSA certified, minimum No. 26 AWG line cord for connection to the Digital Subscriber Line (DSL) network.

5. When installed, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

6. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are interconnected, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.

7. Input power to this product must be provided by one of the following: (1) a UL Listed/CSA certified power source with a Class 2 or Limited Power Source (LPS) output for use in North America, or (2) a certified power source, with a Safety Extra Low Voltage (SELV) output having a maximum of 240 VA available, for use in the country of installation.

8. In addition, since the equipment is to be used with telecommunications circuits, take the following precautions:

   — Never install telephone wiring during a lightning storm.

   — Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

   — Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

   — Use caution when installing or modifying telephone lines.

   — Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

   — Do not use the telephone to report a gas leak in the vicinity of the leak.

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